

# A NEW SPECIES OF *FIMBRISTYLIS* (CYPERACEAE) FROM THE SANDSTONE AND GRANITIC OUTCROPS OF ALABAMA AND GEORGIA

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## ABSTRACT

*Fimbristylis brevivaginata*, a new species of perennial fimbristylid sedge endemic to sandstone and granitic glades in northeastern Alabama and piedmont Georgia, is diagnosed, described, and figured. Differences between it and its closest morphological relatives, *F. puberula* (Michx.) Vahl (vars.) and *F. caroliniana* (Lam.) Fern., are given.

## INTRODUCTION

In the 1960s, during the process of annotating loans of *Fimbristylis* toward completion of a treatment of the genus for North America (Kral 1971), I encountered two samples of a perennial *Fimbristylis* from granite glades of the Georgia piedmont which were particularly hard to place. These, one from around the base of Little Stone Mountain in DeKalb County (*J.K. Small*, 25 Jul 1893, GH, UC), and the other from Hancock County to the east (*R. McVaugh* 5338, GH, UC), are of identical morphology, though separated within the granite outcrop archipelago by more than 50 miles. Tentatively, I placed the two under *F. puberula*, determining to relocate populations for a more definitive study. A visit to the McVaugh locality in 1967 proved to be productive, the locality (3 mi SE of Sparta) appearing little changed from how McVaugh must have found it. A decade later I was able to locate another larger population in Rockdale County a short distance northwest of Millstead, Georgia. Morphologies of the three then-known populations appeared remarkably consistent. During these years I had occasion to revisit Georgia piedmont granites a number of times on other work, keeping an eye out for such plants there, but finding none. I concluded, perhaps rightly, that this particular *Fimbristylis* was rare within that region and deferred the problem unwisely. In 1980 I was surprised to find the same *Fimbristylis* on a sandstone bluff overlooking the Little River in Alabama and was thus stimulated to look further for these plants in similar habitats there and elsewhere in northern Alabama. Such attempts to find other populations within this spatially and geologically different region have thus far been unsuccessful. However, given the added impetus of being assigned to do *Fimbristylis* for FNA, and having been



convinced of the morphological and ecological distinctness of this plant, I hereby describe it.

***Fimbristylis brevivaginata* Kral, sp. nov. Fig. 1.**

*Fimbristylis brevivaginata*, sp. nov.; a *F. puberula* (Michx.) Vahl et vars. foliorum ligulis completis, laminis complanatis, angustioribus, a *F. caroliniana* (Lam.) Fern. scapis angustioris, culmorum basibus bulbosis, spiculis pubescentioribus, ab ambobus habitibus brevioribus, foliorum brevioribus, rhizomatibus fasciculatis, squamis spiraliter imbricatis, valde contractis et attenuatis.

Bulbous-based caespitose perennial 2–5 dm high from scaly, thickened-based, short, attenuate rhizomes. Young culms sub-cormose, forming from axillary buds, emerging from chaffy and fibrillose old leaf bases as short, spirally imbricate-scaly rhizome, the short, red-brown rhizomal scales grading longer uprhizome, passing to foliage leaves, these gradually longer-bladed, from cuspidate to longer, the principal ones (-5)10–17(-20) cm long; sheaths of principal leaves dilated, multicostate, ecarinate, with broad, multicostate bases and broad, scarious, distally fimbriate-ciliate borders, mostly less than 1/5 as long as blades, at junction with them producing a complete, transverse, pale-ciliolate ligule; blades narrowly linear, firm, flat, level or shallowly concave, 1.5–2.5 mm wide, tapering gradually to an abruptly acute, often apiculate tip, margins intermittently scabro-ciliate, incrassate, pale, surfaces pale green, the upper coarsely 7–10-costate at midblade, the lower finely longitudinally striate-nerved. Scapes slender, slightly to very compressed, ca. 1 mm broad, coarsely costate, lateral ones often remotely scabrid distally; anthela mostly simple, of 2–7 spikelets, the slender, smooth, multicostate rays ca. 0.5 mm wide, mostly broadly ascending around the sessile spike, and from 0.5–6.0 cm long, surpassing the primary involucre; primary involucre of 3–4 bladed bracts, the longest mostly 1–3 cm long, their sheaths ciliate, convex, multicostate, costae sometimes sparsely hirtellous, subtending angulately tubular hirtellous prophylls 4–5 mm long, the secondary involucre mostly lacking; spikelets narrowly ovoid to lanceoloid or cylindrical, 5–15 mm long, acute to blunt, red-brown, scales tightly spirally imbricate, red-brown, broadly ovate, convex, smooth to puberulent, the lower ones sterile, all ranging 4.5–5.0 mm long, the lower ones cuspidate, becoming mucronate distally; fertile scales medially 3–5-costate, the central nerve strongest, on lower scales short-excurrent, costal area on younger spikes often green; anthers 3, linear, ca. 2 mm long; style-base flat, linear, ca. 2 mm long, the 2 divaricate, excurved branches ca. 1 mm long; stylar apex and branch-bases fimbriate. Fruit obovoid-lenticular, ca. 1.2–1.5 mm long, the convex faces each with 11–13 ribs, dark brown to greenish-brown with lustrous tints, ribs connected by transversely oriented rows of shallow, narrowly rectangular alveolae, fruit edges somewhat umbonate, pale, apex with a short, truncate apiculus.



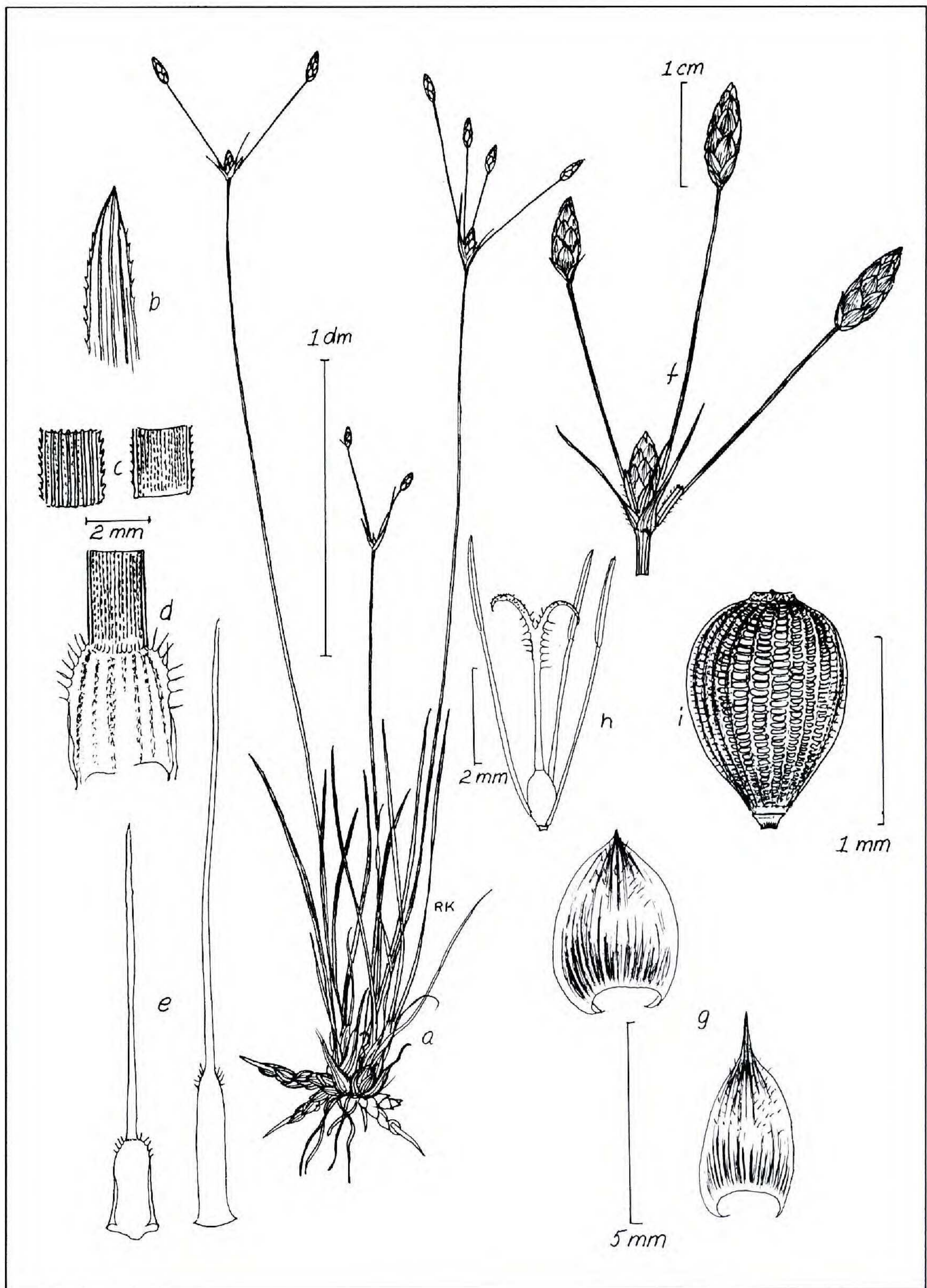


FIG. 1. *Fimbristylis brevivaginata* (Kral 61089). A. Habit sketch. B. Leaf tip. C. Abaxial (left) and adaxial (right) sides of leaf midblade. D. Leaf blade-sheath junction, adaxial side. E. Idealized outlines of two principal leaves. F. Inflorescence. G. Fertile scales, at right one from downspike, above one from upspike. H. Floret. I. Fruit.



In full sun around shallow pools, rivulets or humus-packed moist fissures in sandstones or granites, very local in the Cumberland Plateau of Alabama (DeKalb Co.) and in the Piedmont of Georgia, flowering intermittently from late spring to fall with peaks in June and September.

TYPE: U.S.A. GEORGIA. **Rockdale Co.:** several patches on shallow moist to wet soils over granite outcrop, ca. 2 mi NW Millstead off hwy GA 20, 23 Sep 1977, *R. Kral* 61089 (HOLOTYPE: BRIT; ISOTYPES (FSU, GA, GH, MICH, NCU, NY, PH, RSA, TENN, US, VDB).

Additional specimens examined: ALABAMA. **DeKalb Co.:** sandrock outcrops above Little River, Canyon Parkway 1.4 mi S of jct hwy AL 35, seeps, 24 Sep 1980, *R. Kral* 66381 (VDB); 9 Jun 1981, 67405 (GH, BRIT, VDB); 28 Jul 1981, 67609 (AUA, GH, US, VDB). GEORGIA. **DeKalb Co.:** about base of Little Stone Mountain, 25 Jul 1893, *J.K. Small, s.n.* (GH, UC); **Gwinett Co.:** ca. 1.9 mi SSE Snellville, above E bank of No Business Creek, S of Springdale Drive (Co. rd 364); large doming gneiss outcrop, relatively undisturbed areas S of powerlines, moist sandy flats, 3 Nov 1983, *J.R. Allison* 1927 (GA); **Hancock Co.:** shallow soils about granite outcrops 3 mi SE of Sparta, 26 Aug 1940, *R. McVaugh* 5338 (GH, UC); ca. 4 mi SE Sparta along hwy GA 15, moist sandy peaty flat depressions in granite outcrop area, 28 Jul 1967, *R. Kral* 28705 (GH, BRIT, US, VDB); ca. 3.5 mi SE Sparta, 4.9 mi SSW Culverton, ca. 2 mi W jct with Co. rd 178 and GA 15, scattered granite exposures in woods N of P-185, 24 Sep 1986, *J.R. Allison with M.J. Murphy* 2788 (GA); **Rockdale Co.:** in thin soil on granite outcrop 2 mi N of Conyers, 800 ft el., 14 May 1948, *A. Cronquist* 5184 (GA); granite dome, more tree than shrub than most, few open pools, on Panola Mt., 17 Jul 1971, *A.M. Evans et al.* 45744 (TENN, VDB); **Walton Co.:** 3.75 mi NW Walnut Grove, "Rock of the Ages," huge gneiss flatrock astride Rocky Branch E of Rabbit Farm Rd., (Co. rd 95), 4 Jul 1984, *J.R. Allison* 2340; ca. 5.5 mi SSW of Loganville, 1.95 mi SSW of crossing of Little Haynes Creek by Center Hill Church Rd. Lithonia (granite-) Gneiss flatrock, W side of Black Shoals Rd (Sharon Church Rd.), 0.15 mi due W of jct Miller Bottom Rd, 8 Jun 1989, *J.R. Allison* 3852 (VDB).

As was indicated in the diagnosis and description, this plant shows characters of both *F. puberula* and *F. caroliniana*, differing from the former by its flatter leaf blades and its completely developed ligule, and from the latter by its more compact, shorter, more strongly fascicled, tapering rhizomes; its more bulbous culm bases; its more compact, shorter, more strongly fascicled, tapering rhizomes; its more bulbous culm bases; its narrower scape; and its hairier spikelets. It is distinguished from both species by its consistently lower habit, its much more contracted leaf sheaths and its mode of rhizome development.

While both varieties of *F. puberula* produce rhizomes, those of var. *puberula* are thick, short, and untapered, cloaked by tightly ascending imbricate rows of chaffy remains of older primary leaf sheaths. Thus each rhizomal node has its "bud" or "bulb," each erect in orientation and each developing a bulbous-based culm with erect or ascending leaves with narrow, mostly involute blades. By contrast, a rhizomal shoots of *F. brevivaginata* is itself a strongly tapering, horizontally-oriented bud whose tip becomes the vertically-oriented leafy culm with leaf blades that are distinctly flattened and broader. The other variety of *F. puberula*, var. *interior*, of sandy prairie swales far to the west in the plains of Nebraska, Kansas and Texas indeed produces fascicles of horizontally disposed rhizomes, but these,



while tending to be short and scaly, are distinctly more slender, more contorted, and lack taper. This variety is similar in leaf to var. *puberula*, having narrow, involute, eligulate blades.

*Fimbristylis caroliniana* has much the same rhizome development as *F. puberula interior* but these rhizomes are longer, thicker. Their leaves are flatter and have complete ligules, thus more resembling *F. brevivaginata*. But *F. caroliniana* is taller, broader-scaped, usually has more spikelets on a more flattened, wider scape, and forms extensive clones much different than the cespitose habit displayed by the rest of the complex. In any case, the relationships of *F. brevivaginata* to *F. caroliniana* is of less consequence here simply because of its very different geography and habitat, the latter being confined mostly to coastal situations and more basic substrata.

The outcrops to which *F. brevivaginata* appears confined are sometimes shared by other fimbristyloids, most notably the annuals *F. annua* (All.) R. & S. and *F. autumnalis* (L.) R. & S., which are unrelated. When this manuscript was submitted I had no information about occurrence of any other perennial *Fimbristylis* on granites or sandstones within the same localities *F. brevivaginata* grows. Recently, however, two specimens of *F. puberula* var. *puberula* have been donated to VDB by Mr. James R. Allison that were collected by him from granites in Georgia, one from Harris County (*Allison 3185*) and one from Muscogee County (*Allison 3961*). Both these counties are at or toward the southwestern limit of Piedmont granites in Georgia, at or near the Fall Line. Such evidence, though scanty, supports the idea that the widespread "matrix" species, from which *F. brevivaginata* likely arose, is in this case *F. puberula*, particularly its variety *puberula*. It is nearest morphologically and spatially. The taxonomy is close, but it is consistent for species of, and speciation within, *Fimbristylis*.

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#### REFERENCE

- KRAL, R. 1971. A treatment of *Abildgaardia*, *Bulbostylis*, and *Fimbristylis* (Cyperaceae) for North America. *Sida* 4(2):57 – 227.